American War Inventions Did Much to Gain Victory

HIGH technical honors recently awarded a workman for perfecting a process that permitted quantity production of shell cases during the war brings to mind the many American war inventions that helped to shorten the great struggle. Also centering attention on these devices is the growing right to end viper warfare—use of gas, air bombing and submarines—going forward in the arms conference.

Special Correspondence to THE NEW YORK HERALD.

By DONALD M'GREGOR.

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THE United States to-day is fully at peace with all the world. It is the first time in a decade. War and rumors of war have crowded through the last ten years.

Mexico loomed first—then American eyes turned toward Europe—and now peace. The world readjustment is now well on the way. And, with the Washington conference for the limitation of armaments making marked progress toward insuring continued tranquility among the nations, America now is able to take stock of what it has done in the last ten years—take stock of its developments in the all-important period through which it has just passed.

These developments have been in many lines, but most notably—because of the business at hand—in the grim art of making war. America's war inventions, the story of how they were brought about, the part they played in bringing victory to the nation at arms, will form an absorbing chapter in the histories that will be written in the future.

Turning the Sword Into Plowshares Now

American genius now will turn many of the developments to peacetime work. Many of them will remain in arsenals for use if war ever comes again. They will be weapons tucked away for an emergency, which the nation hopes, particularly at this Christmas time, never will arise.

Save for the bow and arrow virtually every weapon known to man, some of them long regarded as obsolete, was employed on the western front during the world war. This was due to the fact that the battle line extended from the sea on the one end to a neutral country, Switzerland, on the other, so that the ordinary flank movements in warfare could not be employed. It led to the special warfare that continued for so many months, and it brought into play all sorts of weapons, most of them, of course, improved upon since they had been used in the early days.

One noticeable instance of this was the "tin derby" worn by the doughboys in the trenches, to protect themselves against enemy fire. This headgear was nothing more nor less than the armor of the days of old. Some of the soldiers who served as snipers went much further than the headgear, wearing bullet-proof corsets and other types of armor to the average mind associated with the knights of many years ago.

Hand grenades had been used during the Napoleonic wars, when there was close hand-to-hand fighting, but they were improved upon for the last war, and their contents were explosives far more deadly than anything ever known in the old days. Still hand grenades were not a development of the world war.

The airplane as a combat unit was distinctly a development of the world war. It had been used for scouting duty before the outbreak of hostilities, and had been included in the military scheme. But for use in dropping bombs and against other aircraft it was unknown.

War Development Has Much Increased Since Armistice

The truth is that this development has progressed more since the armistice than it did before. The ideas, or a large number of them, were obtained during the war, but the end came too soon to put them into application. The construction of a 4,000 pound bomb, the largest known in military operations, is the work of recent months. Up until recently there has never been a bomb sight really worthy of the name.

The airplane was fairly well developed, it is true, when the war broke out, but only the most preliminary study had been given to its uses in time of hostilities. The few airplanes the armies had were intended for gathering information about the enemy. Their use, as known to-day, developed gradually after the war began.

This came about when one airplane, intent on flying over the enemy's line to get information, was attacked by another. In the first instance fliers, although from opposing armies, simply saluted each other when they passed. Then one day one fired on another, and so it was that air battles began. The use of bombs from airplanes was a similar development.

Instead of the small bombs that were in use when the war ended, the armies now are equipped with large bombs and bombs of many kinds, each for its special purpose—demolition bombs for use against intrenchments, fragmentation bombs sending out waves of small bullets for use against troops, gas bombs and incendiary bombs, to set fire to camps, villages and ammunition dumps.

The Tank and Its Second Cousin, Caterpillar Tractor, Here to Stay

Poison gas is entirely a development of the world war. Up to the time the Germans, in 1915, in the battle of Ypres, liberated poison gas against the Canadians it had not been used in combat. This, however, hardly can be regarded as an invention, for the gases themselves were known. One American gas, the deadliest of all on the list, Lewisite, was developed during the war.

Gas masks, on the other hand, were inventions that grew out of the war. The Allies, confronted with the problem of resisting gas attacks, developed the masks so that they would protect the soldiers from death in agony when they came into contact with the poisons.

The tank also was a war invention. It was the work of the British, who developed it from an idea obtained from a common farm tractor built in Peoria, Ill. One of the English officers saw the tractor in operation on a farm near London, and he applied the principle to the tank.

The caterpillar tractor similarly was a war development. It is, in a sense, a second cousin to the tank, with similar motive power and wheels capable of negotiating all kinds of terrain.

Caterpillar tractors, with their funny belted wheels, now are used for hauling heavy guns, mounted on carriages, the wheels of which are constructed in the same fashion. They haul powerful searchlights used at night to find the enemy; they pull the ammunition wagons over the hills and through the streams; they bring up the baggage from the rear. Some of them, built to seat a score of soldiers, make fast speed across country in advances against a retreating foe.

These tractors have taken the place of the old time army mule. They are pieces of mechanism that never balk—power driven pieces of machinery that form integral parts of the great army which is little more than a machine itself.

Tracer ammunition is a development of the world war. In the main this is intended to assist in aerial combat, but it also has been applied to machine guns and other guns fired from the ground. This new type of ammunition enables those engaged in firing to follow the course of the shots, so that aim may be corrected when it is out of line.

In the ordinary machine gun, for example, one out of every five bullets—the percentage varies—is of the tracer type, constructed so as to send off a fine smoke which is visible to the naked eye and permitting, thereby, an accurate following of the bullet. If the aim is inaccurate it may be corrected.

This development came about when machine guns operating from airplanes were rendered useless, almost, by the inability of the operator to trace the fire. It was a need the army saw, and many army engineers took a hand in the work of finding something to overcome the difficulty.

Similarly a development, a direct result of the war, was the aircraft machine gun itself. The perfection of this weapon is especially interesting, since one of the problems encountered was to prevent a jarring of the airplane, due to the recoil of the gun. This was overcome by firing a powder charge from the rear of the gun, to neutralize the recoil.

In addition to this a gun was devised so that it might be fired through the swiftly moving propeller blades, without hitting them. The airplane, of course, offers a restricted firing base. Due to the tail and to the wings the most advantageous place for firing is from the forward part, through the propellers.

The war also brought about the development of the Browning machine gun and the perfection of the Lewis machine gun, which modern weapons hold an important place in the list of armament on the western front.

Ordnance officers for many years have been and still are, in fact, experimenting with fuse attachments for shells. They doubt if they ever will be able to find a perfect fuse, for, as they put it, such a thing would be a "mind reader fuse." The result is that different fuses are required for different work.

Of all the fuses the army had when the war came on none of them was found to be suitable for anti-aircraft fire. The ordinary fuses would not do because they were devised for a specific and constant air pressure. When used for shells from an anti-aircraft gun they did not work satisfactorily, due to the fact that they could not be adjusted to the rarefied air encountered in high altitudes.

This problem was met and solved by the Waltham Watch Company, and its engineers. The fuse developed is a mechanical device working very much on the order of an ordinary watch, which, when set for a specified number of minutes, will function.

The Sam Browne belt, such as is worn by the officers of the United States Army, first put in its appearance during the world war, although it was the development of a British officer, Sam Brown, in Africa. The belt first was used by the British. In the opinion of some of the highest officers of the American and allied armies it has been well worth while.

In the first place, during operations, the belt enables the officer to be readily distinguished from the enlisted man. He may be covered with mud in the trenches, but every one knows, from the belt, that he is an officer. The belt, being the color of the uniform, is not distinguishable far beyond the line—that is, the enemy cannot see whether a man is wearing a belt or not.

A Good Soldier Is He Who Takes Most Pride in Appearance

But equally important is the effect the belt has on the officer morale. An ill-fitting blouse or one that is soiled shows up more readily when an officer wears a belt, so that the belt forces the officer to be more careful of his appearance. It is held to be true by military authorities that the efficient army is the army which is careful of its personal appearance.

In this connection it is interesting to recall that the British army carries this idea to what might, to the casual observer, be considered the extreme. Take for example the British artillery. Every night the horses are curried and the harness is cleaned so that it shines. It makes no difference if the march has been on in the mud all day and if it is to be continued to-morrow, under the same conditions. The theory is that it will strengthen the morale of the different organizations for them to keep their equipment looking bright. It is a standard for which the British army is striving constantly. Much the same rule applies in the United States army.

The development of helium gas, in the oil fields of Texas, came with the world war. This gas, about which so much has been written of late, because of its successful use in a navy dirigible, is intended for balloons. It overcomes one of the great difficulties experienced with balloons in the past, when they were inflated with hydrogen gas.

It was easy enough to destroy a balloon filled with hydrogen. All the enemy had to do was to hit it with an incendiary bullet, and the balloon went up in flames. Hydrogen is highly inflammable. But this is not true of helium. It has all the buoyancy of hydrogen—perhaps a little less—but it will not burn. With the development of helium has come also the development of a special type of valve to be used on the gas bags.

One of the important things about the discovery, or rather the development of helium gas, is that the United States has the only supply of it in the world. It makes military ballooning safe for the United States, while all other nations at the present time are at a disadvantage in this regard, being forced to depend still on hydrogen.

In the field of communication, both for the army and the navy, there was remarkable development during the war—development, too, that will be of great use to the people of the world in time of peace. All the resources of the nation—civil and military—were called into play to solve the communication problems that were acute from the fact that the battle line was 3,000 miles away from the actual base of operations.

One of the outstanding developments in the way of communication was the airplane telephone, which was brought out at the Signal Corps cantonment at Little Silver, N. J. Through this—an application of radio—it is possible for airplanes in flight to communicate with each other and with the ground.

Airplane and Submarine Telephones Grew Out of Late War

Similarly there was developed a system of telephoning from submarine to submarine and, more important than all, a device which permitted submarine detection, of the greatest value in the defeat of the German submarine campaign. This instrument, connected with land stations by cables, was planted on the floor of the ocean, each equipped with a detector-transmitter to pick up the sound of a submarine propeller. It was possible through this instrument to establish the fact that a submarine was operating beneath the surface, and it was possible also, to give the approximate location. When such information was obtained at shore stations and it was evident, from the known location of our own submarines, that the craft reported belonged to the enemy, a general alarm could be sent out so that the undersurface craft might be destroyed.

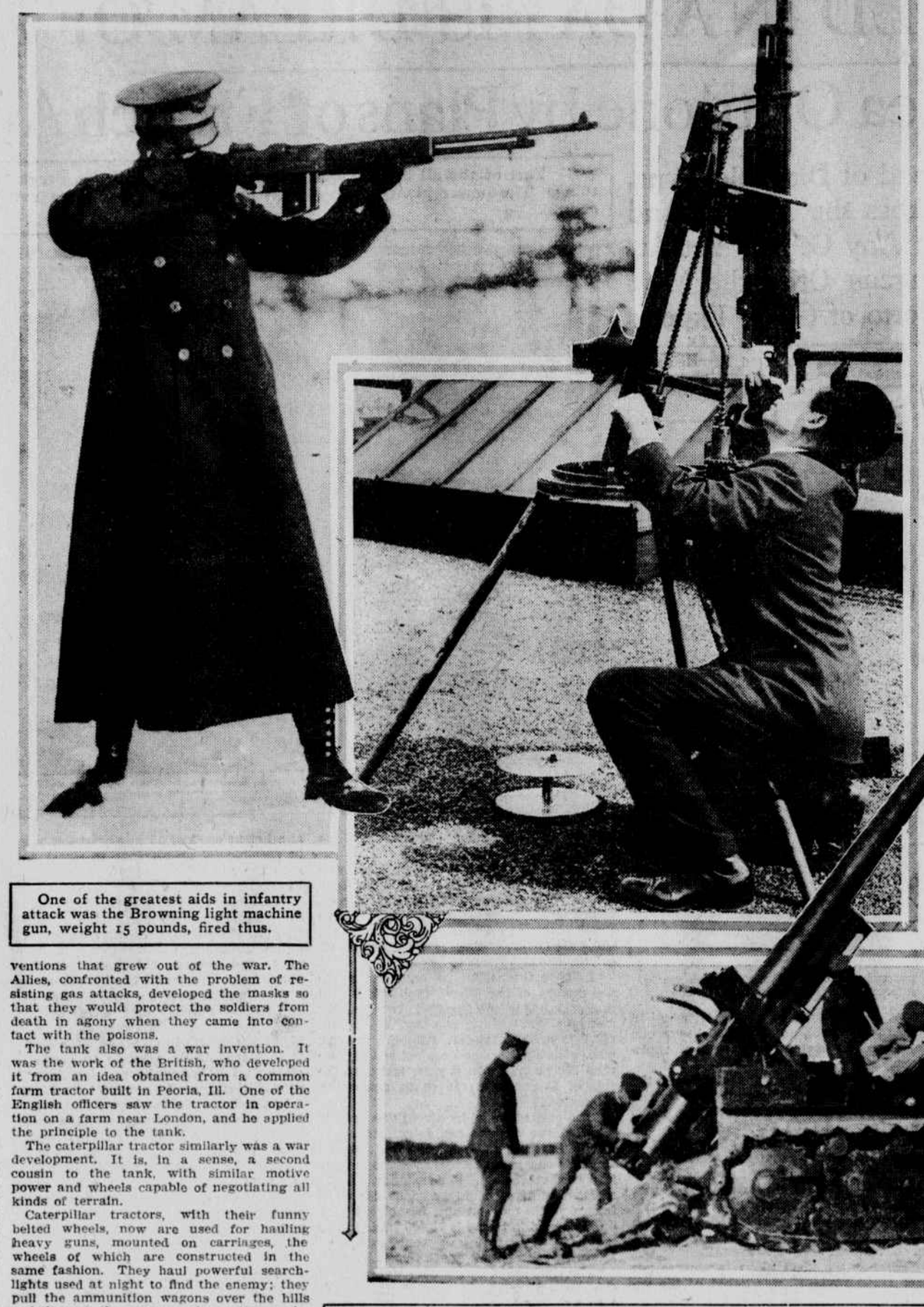
This campaign against submarines, which every one recalls was one of the great problems of the war, also brought out the depth bomb, which was shot off the afterdecks of destroyers and other craft to destroy the enemy.

There was romance, too, in the production of the first machine to transmit undecipherable code. This was one of the most important of all the inventions of the war, and made certain that messages could be sent without the enemy being able to read them.

The machine is capable of transmitting in plain English messages absolutely undecipherable en route. It is the only undecipherable code device known to man.

The machine will transform an ordinary message into cipher, transmit it with absolute secrecy and decode it at the other end. The message travels along at the rate of from forty to seventy words a minute.

The message is first written in plain English in the office in which it originates. It is copied then, on a typewriter keyboard, by which it is set down into a combination of perforations on a long paper tape. This tape is fed into a transmitter and the result, at the other end of the wire, is a tape containing a corresponding set of perforations. Run through a deciphering machine it comes out in plain English as originally written. Through the shifting of the keys it is possible to create 999,000 code combinations, none of which can be read during transmission. It insures absolute secrecy in military communication.



Menace of bombing by airplane caused the development of this machine gun to fight off invading aerial squadrons.

One of the greatest aids in infantry attack was the Browning light machine gun, weight 15 pounds, fired thus.

Heavy artillery made mobile by the caterpillar tractor was a distinct outgrowth of the war. Picture shows the U. S. Army's eight inch gun, range fourteen and one-half miles, and its tractor. Total weight, 45,000 pounds; speed, fifteen miles per hour.

Women's Great Part In Arms Conference

Historic References to Trouble Making Notwithstanding, Position of Sex Is Recognized as Always Against War

Special Correspondence to THE NEW YORK HERALD.

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WOMEN have always been for peace. In the twenty thousand years or so of recorded or guessed at human history there have been beautiful troublemakers here and there to upset the world, such as it was. The lion and the lizard romp over some of their achievements. There was Helen of Troy, for example—if she was a real person and not merely the seductive fancy of an old, blind beggar-poet. Cleopatra we always think of in this trouble-making connection, whether rightly or wrongly it is hard to say, historians are such innocent liars. Old Otway, who versified for the British of King James's day, held a dour opinion of the sex as inciters to war. Hear the grumpy old person:

What mighty ills have not been done by women!
Who was't betrayed the Capitol?—A woman!
Who lost Mark Antony the world?—A woman!
Who was the cause of a long ten years war
And laid at last old Troy in ashes?—A woman!
Destructive, damnable, deceitful woman!

Rough, isn't it? Nothing for the admittedly superior sex to celebrate about. But the point is, dear old Otway was twisted in his reasoning. The variety of sprightly lady that let the Gauls in, let Antony in, in another sense, and gave Homer the material for two books is not the sort that rocks the cradle and rules the world. That kind is the giddy exception and doesn't count in the great sweep of human troubles and joys. The kind that does count is the kind—the millions upon millions of unhonored and unsung women whose grief because of war would have filled the Mississippi River bank full for a century—you don't read about in the "Iliad" or the "Odessey" or in the "Tales of Ancient Rome," or see in the movies for that matter. They have always been for peace. If you want a reason, it is because women have always had a clearer appreciation of the value of life than men have had.

Only recently have they been permitted by man, vain, barbarously sensitive, to give voice to their instincts. Man has gone along cherishing the notion that war makes rattling good history. Woman knows that it makes widows and orphans and misery that they must live to endure. Man may die in an odor of glory. Woman must live to pay the taxgatherer after the flags have been furled and the streets are dark. It is in "Hiawatha" that Longfellow muses:

It is the fate of woman
Long to be patient and silent, to wait
Like a ghost that is speechless.

Women's Creed Is a Bad War And a Good Peace

The real women—not the big eyed vamps of history, the beautiful trouble makers—anticipated Ben Franklin thousands of years ago in the conviction that there never was a good war or a bad peace. But what could they do about it? The twentieth century had to come along before they dared raise their voices and utter even a few words of common sense. Women have known since the days of the mammoths and the saber tooth tiger that war, like dueling, settles nothing, is as likely to favor the unjust as the just. God and the heaviest artillery isn't a mere epigram. Study why the Germans lost, study the chapter of accidents which cost them the world, and ponder over war as a resolvent of justice.

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There have been any number of peace conferences before the extraordinary parliament which is being held in Washington. Peace conferences have been fashionable as long as war. Did you ever read about a peace conference before which bothered to lean its august ear toward the feelings and wishes of women? I think not. Go back only a little way, not far enough to strain imagination, and what do we have? A glittering assembly of important males met to carve up Europe for the gain and glory of the masculine sex. Were women invited to sit in? Not so it could be noticed then or thereafter. What happened was something like this: The Right Hon. Lord Jiggsteps, returning to the manor and being asked, timidly, by Lady Jiggsteps if any progress had been made at the day's plenary session toward wiping out war, replied: "Odds bodkins, fairest love! Such coarse matters are not for thee, daintykins! Bother not thy lovely head with affairs so rude and blunt. Come, strum me thy zither!"

That was the kind of *communiqué* the ladies got not so long ago when they requested news of a peace conference. Something seems to tell me that Daintykins, even in those suffrageless days, must have gritted her pearly teeth, swallowed hard and prayed for help to stay her hand against the chump that the good God and Father Boniface had tied her to! Welladay, a woman's place was in the home then.

No, the sex we are worrying our heads about, speculating as to whether they will like the Christmas present we have tucked away under the rack where she knows we keep nothing but horrid old home brew, didn't cut much ice in the peace conferences antecedent to the conference of Washington. They were scarcely among those present in any sense. But Washington is something else again. A change has come over the—shall we say the spirit of mankind? Women count for something in this parliament. Their influence is both direct and indirect and very potent. It is true that men, Hughes, Balfour, Briand, Kato, chanzer and their associates, get the credit as of old and the front pages, but nothing in this world is a solider fact than the woman influence which not only precipitated the conference but held it steady toward its destined end.

The Work for Peace Was Fostered by Women Wisely

This is not a catalogue of "notable women" if you please. There are women here who are not at all notable or distinguished, but that have exerted a very powerful influence to keep the conference off the rocks. You can't say that Lady This or the Countess of That or Mrs. Secretary So and So is responsible for the good work. Not at all. The good has been furthered by the restless momentum of women the world over, acting in a thousand subtle but mandatory ways over the statesmen responsible for performance. When the real story of the Washington conference is told, if ever, there will be a fascinating chapter devoted to this. There will be a chapter or two devoted to the benevolent, wise persistency of the right kind of women who kept the peacemakers up to their job, smiling away at dinners the mountainlike obstacles that had been raised in the secret sessions, smoothing ruffled sensibilities, placating injured vanities, bolstering up faint hopes and always keeping before the peacemakers, like an ikon stamped with gold, the vision of the peace that the People silently, implacably waited for.

As I say, this is not a catalogue of women's names. Possibly you may have discerned in the news reports or even in the columns of society reports some achieving identities. There are literally scores of women, so fortunately situated as to be the battalion of life for their sex the world over, concerned in this weightiest victory. Among them are the women of American official life, some British women, a French woman or two, a very, very old Japanese lady, several sprightly Italians and at least two Chinese ladies who find their frocks on the rue de la Paix and in Paris. Neither the individuals nor the nationalities count for much in the sum total of what the sex has done here. There is one man who knows pretty much all the story. That is the President of the United States. Maybe he will tell it in a message to the Congress.